Menstrual Cycle

- Normal
  - Length: 21-35 days
  - Duration: 2-7 days
  - Regularity: generally predictable month to month

Proliferative/Follicular Phase
- Day 7-14
- Estrogen causes proliferation of endometrium and follicular growth
- Estrogen triggers LH surge causing ovulation at Day 14

Secretory/progestational phase/luteal
- High levels of progesterone
- Progesterone works on thickened estrogen-primed endometrium to convert it to thickly vascularized tissue
Amenorrhea

• Primary
  – No menses by 14 years and absence of secondary sex characteristics
  – No menses by 16 years with presence of secondary sex characteristics

• Secondary
  – No menses for 3 months- previous cycles normal
  – No menses for 6 months- previous cycles irregular

Primary Amenorrhea

<table>
<thead>
<tr>
<th>Karyotype</th>
<th>Labs</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gonadal dysgenesis (Turner’s syndrome)</td>
<td>45, X, High FSH</td>
<td>Cyclic estrogen and progestins</td>
</tr>
<tr>
<td>Hypothalamic-Pituitary insufficiency</td>
<td>46, XX, Low FSH, LH</td>
<td>Cyclic estrogens and progestins</td>
</tr>
<tr>
<td>Androgen insensitivity</td>
<td>46, XY, High testosterone</td>
<td>Remove testes, start estrogen</td>
</tr>
<tr>
<td>Imperforate hymen</td>
<td>46, XX, Dx on PE</td>
<td>Surgically open</td>
</tr>
<tr>
<td>Anorexia</td>
<td>46, XX</td>
<td>Tx disorder</td>
</tr>
</tbody>
</table>
Secondary Amenorrhea

- Pregnancy most common cause!!
- Also, polycystic ovaries common cause
- Always order betaHCG, then TSH and Prolactin

Secondary Amenorrhea

- Progesterone Challenge Test (PCT)
  - Medroxyprogesterone acetate 10mg PO x 7 days
  - If bleeding occurs= anovulatory cycles

Secondary Amenorrhea

- If bleeding does not occur after PCT:
  - Initiate estrogen-progesterone challenge test (EPCT)
    - If bleeding occurs- FSH and LH
- If bleeding does not occur after EPCT:
  - Sonogram
  - Hysterosalpingogram
  - Outflow tract obstruction (Asherman’s syndrome)
Abnormal Bleeding-Terms

- **Menorrhagia** - normal frequency but heavy or *prolonged flow*.
  - Common causes: ectopic, Von Willebrand’s Disease, submucous myomas, endometrial hyperplasia, IUDs, tumors

- **Metrorrhagia** - irregular bleeding *between* cycles.
  - Endometrial polyps, endometrial/cervical carcinoma, OCs

- **Menometrorrhagia** - irregular frequency plus heavy and prolonged
  - Molar pregnancy, malignant endometrial tumors, premenopause

Abnormal Bleeding

- **Anovulatory cause** (dysfunctional uterine bleeding-DUB)
  - Unpredictable, irregular bleeding
  - Most commonly caused by hormonal deficiencies or excesses
  - Usually no pathologic cause
  - Most commonly extremes of ages (under 20, over 40)

- **Ovulatory cause**
  - Cycles are predictable with metrorrhagia
  - Most commonly caused by endometrial polyps or submucous leiomyomas

Abnormal Bleeding-Workup

(as necessary according to hx)

- Pregnancy test! - Most common cause of DUB in reproductive years

- Abdominal or vaginal sonogram

- Endometrial Biopsy
  - Moderate suspicion of hyperplasia or carcinoma
  - Over 35 years with presence of obesity, HTN, DM
  - All patients after menopause

- Hysteroscopy “gold standard” to evaluate pathology in the uterine cavity
Abnormal Bleeding-Management

• Anovulatory (Dysfunctional uterine bleeding) suspected:
  – Progestin trial- If bleeding stops:
    • Prolactin level (pituitary prolactinoma)
    • TSH (hypothyroidism)

• If bleeding continues despite progestin trial and no endometrial lesions or other causes:
  – NSAIDS, oral contraceptives or danazol
  – Endometrial ablation
  – Hysterectomy-last resort

Primary Dysmenorrhea
  – NO PATHOLOGIC CAUSE
  – MC within 2 yrs of menarche but can be any age
  – Symptoms
    • Lower abdominal-pelvic cramping/pain on 1st day of menses
    • N/V, Diarrhea
    • Headache
  – Causes
    • Increased prostaglandins
    • Increased leukotriene levels
  – Exam- normal
  – Management
    • NSAIDS
      – Ibuprofen first
      – Cox-2 inhibitors (celecoxib-Celebrex) equally effective, less GI SE, more expensive
    • Oral contraceptives
    • Vitamin B or magnesium, acupuncture
### Secondary Dysmenorrhea

- **Excessive menstrual pain arising in midreproductive years, USUALLY PATHOLOGIC**

- **Causes**
  - Endometriosis
  - Pelvic adhesions
  - Fibroids
  - Polyps

- **Symptoms**
  - Pelvic pain that is dull and aching, related to menstrual cycle but timing depends on cause
  - Infertility
  - Dyspareunia

- **Exam-depends on cause**

- **Diagnosis**
  - Pelvic sonogram
  - Laparoscopy

- **Management**
  - Depends on cause

### Premenstrual Syndrome (PMS)

- **Physical and emotional symptoms that occur during second half of menstrual cycle and interfere with normal functioning**

- **Cause**
  - Low serotonin levels

- **Symptoms**
  - Absent in first half of cycle
  - Depression, irritability, mood swings
  - Breast tenderness, weight gain, bloating
  - Muscle aches, joint pain, headache

- **Exam**
  - Benign

- **Diagnosis**
  - Menstrual diary- symptoms for 2 consecutive cycle
### Premenstrual Syndrome (PMS) Management

- **Lifestyle modifications first**
  - Stress Management
  - Exercise
  - Calcium carbonate, magnesium, vitamin B6, vit. E, St. John’s wort
  - Dietary
    - Small frequent meals with increased carbohydrates
    - Decrease caffeine, alcohol, tobacco, chocolate, sodium

- **Medications second**
  - Selective serotonin reuptake inhibitors (SSRIs)- emotional symptoms
  - NSAIDS- muscle aches, joint pain

---

### Endometriosis

- Endometrial tissue outside uterine cavity
- Women of reproductive age

- **Location of Lesions**
  - Ovary (most common)
  - Cul-de-sac
  - Broad ligaments

- **Symptoms**
  - Dysmenorrhea- low sacral backache premenstrually that resolves with menses
  - Dyspareunia
  - Infertility

- **Exam**
  - Classic finding-retroverted uterus with uterosacral ligament nodularity

- **Diagnosis**
  - clinically
  - definitive-laparoscopy
Endometriosis

- Endometrial tissue outside uterine cavity
- Women of reproductive age

- Location of Lesions
  - Ovary (most common)
  - Cul-de-sac
  - Broad ligaments

Management

- Medical - all suppress estrogen
  - OTC NSAIDS or oral contraceptives (mild symptoms)
  - Continuous progesterone (pseudopregnancy)
    - (Depo-Provera IM or Provera PO)
  - Danazol-testosterone (pseudomenopause)
    - Side effects: hot flashes, acne, wt gain, deepening of voice (can be permanent)
    - Can be used up to 6 months
  - Leuprolide IM or nasal- (GnRH agonist) q 3 months (pseudomenopause)
    - Limited to 6 months total
- Surgical
  - Adhesion lysis to maintain fertility
Uterine Leiomyomas

• Symptoms
  – Abnormal menstrual bleeding (most commonly menorrhagia) - from submucous myomas
  – Pain
  – Pressure
  – Infertility

• Exam
  – Uterus is enlarged, firm, nontender, asymmetrical

Uterine Leiomyoma

• Imaging Studies
  – Sonogram
  – Hysterosalpingogram - submucous myomas

• Management
  – Conservative - most do not require treatment
  – GnRH agonists - Lupron - limited to 6 months
  – Uterine artery embolization
  – Endometrial ablation - if no desired fertility
  – Surgery
Endometrial Cancer

• MOST COMMON GYN CANCER
• Risk Factors
  – Prolonged estrogen exposure
  – Nulliparity
  – Late menopause
  – Chronic unopposed estrogen
  – Tamoxifen
  – Diabetes, HTN, obesity
  – Cancer of the breast, colon, ovaries
• Oral contraceptives have some protective effect

Endometrial Cancer

• Tumor Types
  – Adenocarcinoma- most common (75%)
  – Adenosquamous
  – Clear cell

• Symptoms
  – Post menopausal bleeding (most common)

• Exam
  – Usually normal

Endometrial Cancer

• Diagnosis
  – Endometrial biopsy
  – Endometrial curettage- definitive
  – Hysteroscopy
  – Staged I-IV
Endometrial Cancer - Management

- **ALL STAGES**
  - Total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH-BSO)
- **Stage I and II** - Radiation sometimes used postoperatively
- **Stage III & IV**
  - Radiation
  - Progestins - if radiation fails
  - Chemotherapy - advanced or recurrent CA

Ovarian Cysts

- **Cysts in any postmenopausal woman are considered malignant until proven otherwise**

**Benign**
- Common in reproductive age group
  - Many resolve spontaneously
  - Management depends on type of cyst

Ovarian Cysts - Benign/Functional

- **Functional (most common type) - excessive response to otherwise normal function**
  - Follicular - unilateral, resolve within 60 days
  - Corpus Luteum - unilateral, associated with pregnancy
  - Theca Lutein - bilateral, high B-HCG titers

- **Diagnosis**
  - Sonogram - mobile, simple, fluid filled

- **Management**
  - Observation 30-60 days
  - Follicular or theca lutein - surgical evaluation if present without change for greater than 60 days
Ovarian Cysts - Benign/Nonfunctional

- **Nonfunctional**
  - do not arise from normal function but are not neoplastic
  - Endometrioma - unilateral hemorrhagic or “chocolate cysts”

- **Management**
  - Surgical incision

Polycystic Ovary Syndrome

- #1 cause of androgen excess and hirsutism
- Bilateral
- Patients most commonly present b/c of hirsutism or infertility
- Also associated with ovulation and obesity
- Normal menses followed by episodes of amenorrhea that become progressively longer
- Sonogram/Labs
  - "oyster ovaries" OR "string of pearls" - enlarged with smooth pearl-white surfaces without indentations
  - ↑ androgen levels, ↑ LH/FSH ratio, lipid abnormalities, insulin resistance

Polycystic Ovaries

- **Management**
  - OCPs, DepoProvera IM or Provera PO, weight loss
  - clomiphene citrate (Clomid) for fertility
  - Metformin increases ovulation and pregnancy rates
Ovarian Cysts - Neoplastic masses

- Benign neoplastic processes
  - Serous cystadenomas - unilocular, most common ovarian epithelial tumor
  - Mucinous cystadenomas - multilocular
  - Benign cystic teratomas - mobile on long pedicles
    - Most common germ cell tumors
    - Most common ovarian neoplasm - women less than 30 years old

- Management
  - Surgical excision

Benign vs. Malignant Ovarian Tumors

- Sonogram Appearance
  - Benign
    - Smooth, regular surfaces, mobile, unilateral, small, simple
  - Malignant
    - Nodular, irregular, fixed, bilateral, large, complex, or loculated

Ovarian Cancer

- Second most common gyn malignancy
- Mean age of dx - 69 years (higher than other gyn CA)

- Risk factors
  - BRCA1 gene
  - Family history
  - More lifetime ovulations (nulliparity, late menopause)
  - Caucasian or Asian ethnicity
  - Diet high in saturated fat

- Screening
  - Bimanual pelvic exam
  - Currently sonogram not done for routine screening
Ovarian Cancer

• Tumor Types
  – Epithelial- most common (80%)
  – Germ cell- (15%)

Ovarian Cancer- Clinical Findings

• Symptoms
  – Early-almost always asymptomatic
  – Later-abdominal distension or pain, early satiety, urinary frequency, change in bowel habits

• Exam
  – Fixed, bilateral nodular pelvic masses
  – Abdominal distension/ ascites
  – Sister Mary Joseph’s nodule-metastatic implant in the umbilicus

Ovarian Cancer

• Diagnosis
  – Sonogram is suggestive
  – Definitive dx- histological examination

• Tumor Markers
  – Epithelial Tumors (most common)
    • CA-125
    • CEA
Ovarian Cancer - Management

- Most patients
  - Total hysterectomy and bilateral salpingo-oophorectomy (TAH-BSO)
  - Chemotherapy - intravenous or intraperitoneal
  - Sometimes radiation

Pap Smear Screening

- Indications
  - Women under 21 should not be tested regardless of sexual initiation
  - 21-29: every 3 years
  - 30-65: Pap plus HPV every 5 years or Pap alone every 3 years
  - Over 65: previously normal Paps - no testing
  - History pre-cancer: PAPs 20 years after that diagnosis
  - Even if vaccinated, follow same schedule
PAP-Bethesda System

- Statement of Adequacy
  - Must have endocervical cells
  - Unsatisfactory if inflammatory cells
  - If unsatisfactory, repeat in 6-12 weeks

PAP-Bethesda System-Interpretation

- Negative for intraepithelial lesion or malignancy
  - Can also have comments about organism or inflammation

- Squamous Epithelial cell abnormalities
  - Atypical squamous cells
    - ASC-US - atypical squamous cells of uncertain significance
    - ASC-H - atypical squamous cells—cannot exclude high-grade lesion
  - Low-grade squamous intraepithelial lesion (LSIL)
    - Associated with transient HPV infection, unlikely to proceed to cancer
  - High-grade squamous intraepithelial lesion (HSIL)
    - HPV viral persistence and invasive potential
      - Cancer

PAP—Management

- ASCUS
  - Repeat PAP 4-6 months, if second is same or worse, colposcopy

- ASC-H, LSIL, HSIL
  - Colposcopy/biopsy/HPV testing
Grading Cervical Lesions

<table>
<thead>
<tr>
<th>Cytology (from PAP)</th>
<th>Histology (Biopsy from colposcopy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASC</td>
<td>CIN 1 - Mild dysplastic changes</td>
</tr>
<tr>
<td>LSIL</td>
<td>Same as above</td>
</tr>
<tr>
<td>HSIL</td>
<td>CIN 2, CIN 3 - moderate-severe dysplastic changes</td>
</tr>
<tr>
<td>Cancer</td>
<td>Invasive Cancer</td>
</tr>
</tbody>
</table>

Management —abnormal PAP (according to biopsy)

- **CIN1** (any of the following are appropriate)
  - Repeat PAP 6-12 months
  - Repeat PAP in 12 months and colposcopy
  - HPV DNA testing

- **CIN2 or CIN3**
  - Cryotherapy (freezing ectocervix with liquid nitrogen)
  - Cold-knife conization
    - Cone-shaped area is cut out of cervix encompassing lesion
    - May lead to incompetent cervix
  - Loop electrosurgical excision procedure (LEEP)
    - Heated wire loop excises lesions
    - Incompetent cervix less likely

Cervical Cancer

- Third most common gyn cancer

- Risk Factors
  - Early sex, multiple sex partners
  - Cigarette smoking
  - Immunosuppression (HIV)
  - HPV types 16, 18, 31, 33 - HPV found in over 99% of cervical CA
Cervical Cancer

• Tumor Types
  – Squamous-most common (90%)
  – Adenocarcinoma (less than 10%)

• Symptoms
  – Usually asymptomatic
  – Post-coital bleeding-most common

• Exam
  – Friable, bleeding cervical lesion

• Diagnosis
  – PAP and biopsy
  – Staged I-IV

• Management
  – Hysterectomy
  – Stages III and IV- add radiation and chemo
### Cystocele/Rectocele/Uterine Prolapse

**Symptoms**
- Vaginal fullness, pressure, feeling of incomplete voiding or defecation

**Treatment**
- Topical estrogen therapy (cystocele)
- Pessary
- Kegel exercises
- Surgical repair

---

### Mastitis

**Occurs mainly in breast feeding women**
**Usually caused by nipple trauma**
**Most commonly S. aureus**

**Symptoms**
- Unilateral erythema, edema, tenderness
- Usually only 1 quadrant of breast affected
- Fever and chills

**Management**
- Dicloxacillin, cefalexin or erythromycin
- Alternate treatment-clindamycin
- Continue breast feeding on affected side

---

### Breast Abscess

**Progression from mastitis**

**Symptoms**
- Same as mastitis with addition of:
  - Localized mass
  - Systemic signs of infection

**Management**
- Incision and drainage
- Nafcillin/oxacillin IV OR cefazolin PLUS metronidazole
- Alternat-Vancomycin
- Stop breast feeding on affected side
### Fibrocystic Breast Disease

- Most common benign condition of the breast
- 20-50 year olds
- Symptoms
  - Painful cyclic bilateral breast pain (usually premenstrual)
  - Size of cysts fluctuate during the menstrual cycle
- Exam
  - Bilateral cysts that vary in size

### Fibrocystic Breasts

- Diagnosis
  - Sonogram shows fluid filled cysts
- Management
  - Reduce caffeine intake, increase oral vitamin E
  - Oral contraceptives
  - Severe symptoms
    - Bromocriptine, tamoxifen (not common)

### Breast Fibroadenoma

- Most common benign breast tumor in young women, usually within 20 years of puberty
- More often in Black than White women
- Symptoms
  - Painless unilateral lump
- Exam
  - Mobile, firm, smooth, rubbery lump
### Fibroadenoma

- **Diagnosis**
  - Sonogram: smooth, uniform, solid breast mass
  - Fine-needle aspiration shows solid vs. fluid

- **Management**
  - Small masses: clinical observation
  - Larger masses: surgically removed

### Breast Carcinoma

- **MC cancer in women, 2nd MC cause of cancer death**

- **Risk Factors**
  - BRAC1 and 2 (40-80% risk of Breast CA) (keep in mind that only 5-10% of women diagnosed have the genes)
  - Prolonged unopposed estrogen
    - Early menarche, late menopause, late first pregnancy
    - Nulliparity
    - Over 40 years old
  - Hyperplasia with fibrocystic disease
  - High fat diet
  - Obesity

### Mammogram Screening

- **If average risk**
  - Start at 40 years old
  - Ages 40-49: repeat every 1-2 years
  - At age 50: repeat every year

- **Genetic Risk Factors**
  - Start between 25-35 years old
  - Consider MRI

  *American Cancer Society facts and figures 2012*
### Breast Cancer

#### Tumor Types
- **Infiltrating ductal** (invasive ductal)- most common (80%)
  - Painless stony hard unilateral mass. Begins as ductal carcinoma in situ (DCIS)
- **Infiltrating lobular**- (10%)- frequently bilateral
- **Inflammatory**- (2%) *(peau d’orange)*. Poor prognosis
- **Paget’s Disease**- (1%)- pruritic, scaly rash on nipple

#### Symptoms
- Painless mass (70%)- mc in upper outer quadrant
- Nipple discharge
- Erosion
- Itching of the nipple

#### Diagnosis
- **Exam**- 90% of masses are found by patient
- **Ultrasound**- Differentiates solid from cystic
- **Mammogram**- Most common screening for non-palpable mass
- **Fine-needle aspiration**- Bloody fluid more likely cancer than clear fluid
- **Open biopsy**- Definitive diagnosis for breast disease
### Breast Cancer Management

**Surgery**
- Lumpectomy with sentinel lymph node biopsy vs. modified radical mastectomy

**Oncotype Dx Test**
- Sometimes used to determine need for chemo in Stage I and II hormone receptor + cancer
- Looks at 21 genes in tumor to determine likelihood of metastasis.

### Radiation
- Always after lumpectomy
- Can be used before or after surgery in advance disease

### Chemotherapy
- Non estrogen sensitive receptor tumors and most patients with hormone therapy
  - Single agent - node-negative CA less than 1 cm
  - Multiple agents - node metastases or primary CA larger than 1 cm

### Hormone Therapy
- For estrogen or progesterone positive receptor tumors
  - Tamoxifen – used after chemo and/or during radiation
  - Aromatase Inhibitor - Arimidex (anastrozole) first line of hormone tx for metastatic CA-less endometrial CA, DVT than tamoxifen but more musculoskeletal disorders and fx
  - Zoledronic acid (Zometa-a bisphosphonate) given to decrease fractures, bone pain and decrease reoccurrence of endocrine responsive Breast CA.
Menopause

- Mean age is 51 years old

- All symptoms and signs of menopause are related to estrogen deficiency

Menopause-Symptoms

- Immediate changes
  - Cessation of menses
  - Hot flashes
  - Decreased vaginal lubrication
  - Depression/mood swings/irritability

- Late changes
  - Osteoporosis
  - Cardiovascular disease
Menopause-Signs

• Decreased size of uterus and ovaries, breasts
• Cystocele/rectocele/uterine prolapse
• FSH greater than 30mIU/mL diagnostic for menopause

Menopause-Management

• Hormone Replacement Therapy (HRT)
  – Most commonly Rx for hot flushes, vaginal dryness
  – Also helps prevent osteoporosis, dementia and colon cancer but these are not current indications for treatment
  – Contraindications
    • Liver disease
    • Thrombosis
    • CA of endometrium or breast

• Hormone Replacement Therapy
• Risks
  – Coronary heart disease, stroke, venous thromboembolism
  – Breast cancer (up to 25% increase)
### Menopause-Management

- Alternate therapies of HRT:
- Hot Flashes
  - Depo-medroxyprogesterone acetate IM
  - SSRIs (Paxil most common)
  - Yoga, acupuncture
  - Soy, black cohosh
- Osteoporosis
  - Calcium with Vitamin D
- Vaginal Dryness
  - Topical estrogen

### Vaginitis

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Symptoms</th>
<th>Microscopic finding</th>
<th>PH</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candida</td>
<td>Itching, white discharge, odor, redness</td>
<td>Yeast-like, white &quot;cottage cheese&quot;</td>
<td>4.0 - 5.0</td>
<td>Fluconazole PO single dose OR &quot;azole&quot; creams 3-7 d</td>
</tr>
<tr>
<td>HIV, Diabetes, Antibiotics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrush</td>
<td>Itching, redness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal dryness, ulceration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td>Malodorous, green/yellow discharge, fishy odor</td>
<td></td>
<td>4.0 - 5.0</td>
<td>Metronidazole 500mg BID or 750mg PO x 7 d OR meprofiltazone gel intervaginally x3d OR Clindamycin cream x 7 days</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>Sexual activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odor, malodorous discharge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichomonas</td>
<td>Malodorous discharge, green/yellow, &quot;frothy&quot; &quot;strawberry cervix&quot;</td>
<td></td>
<td>5.0 - 6.5</td>
<td>Metronidazole 2g PO x 1 dose OR Tinidazole 2g x1</td>
</tr>
</tbody>
</table>

---

**Candida**

![Clue Cells - CDC PHIL 3720](http://en.wikipedia.org/wiki/File:Clue_cells_-_CDC_PHIL_3720.jpg)

**Motile flagellated protozoa**

![Motile flagellated protozoa](http://upload.wikimedia.org/wikipedia/commons/c/c3/Pap_test_trichomonas.jpg)
• Metronidazole (Flagyl) warning:
  - Avoid ETOH and sun exposure

Cervicitis

• Chlamydia
• Gonorrhea
• Human Papillomavirus (HPV)
Chlamydia

- Most common cause of mucopurulent cervicitis and most common bacterial STI in women
- Chlamydia trachomatis

Risk Factors
- Sex less 20 years old
- Multiple sex partners

Presentation
- Most often asymptomatic
- Mucopurulent cervical discharge
- Cervical motion tenderness

Labs
- Nucleic acid amplification test (NAAT) "expanded gold standard"
- Direct fluorescent antibody test

Management
- Azithromycin 1gm single dose OR Doxycycline BID x 7 days
- In pregnancy- azithromycin 1 gm x 1 dose OR amoxicillin TID x 7 days
- Treat sexual partners

Gonorrhea

- Neisseria gonorrhoeae
- Often co-infection with Chlamydia

Presentation
- Often asymptomatic
- Vaginal itching and burning with dysuria or rectal discomfort
- Purulent cervical discharge
- Cervical motion tenderness

Disseminated infection
- #1 cause of septic arthritis in young, sexually active adults
  - Maculopapular lesions on hand/feet, tenosynovitis, endocarditis, meningitis
**Gonorrhea**

- **Labs**
  - Nucleic acid amplification test (NAAT)

- **Management**
  - Treat for both gonorrhea and chlamydia
  - Cefixime PO single dose or ceftriaxone IM single dose
  - No fluoroquinolones due to resistance
  - Treat partners

---

**Human Papillomavirus (HPV)**

- Most common viral STI in women
- HPV results in genital warts (condylomata acuminata)
- Subtypes 6 and 11 more common and benign
- Subtypes 16, 18, 31, 33 associated with cervical and penile cancer
- Incubation can be 3 months or longer

- **Presentation**
  - Cauliflower-like warts on external genitalia, anus, cervix or perineum

- **Diagnosis**
  - HPV DNA testing (13 high risk types including 16, 18, 31, 33)
  - Direct visualization or PAP

---

**HPV**

- **Management**
  - Small lesions
    - Podophyllin
    - Trichloroacetic acid
    - Imiquimod
  - Large lesions
    - Cryosurgery
    - Laser ablation
    - Surgical incision
HPV-Prevention

- Gardasil vaccine
  - Girls and boys 9-26, recommended at 11-12 yrs.
  - Protects against 6, 11, 16, 18
  - 3 doses (1st, 2nd 2 months later, 3rd 6 months after 1st)

Pelvic Inflammatory Disease (PID)

- Most commonly presents as acute salpingo-oophoritis
- Pathogens ascend to upper GU tract, most often at menses

  - Pathogens
    - Chlamydia-most common
    - Gonorrhea
    - E. Coli

  - Risk factors
    - Age less than 20
    - Multiple partners
    - Prior PID
    - Vaginal douching

PID

- Symptoms
  - BILATERAL abdominal-pelvic pain-onset can be gradual or sudden
  - Pelvic pressure, back pain that radiates down legs

- Exam
  - Mucopurulent cervical discharge
  - Cervical motion tenderness and bilateral adnexal tenderness
  - +/- fever
  - Rebound tenderness on abdominal exam
PID

• Diagnosis
  – Cervical cultures
  – Elevated WBC and ESR, C-reactive protein
  – WBCs on wet prep
  – Transvaginal sonogram-thickened fluid filled tubes

• DDx
  – Ectopic
  – Appendicitis
  – Pyelonephritis

Management

• Inpatient (indications for hospitalization)
  • Pelvic abscess
  • Fever above 102.2
  • Pregnancy
  • Outpatient treatment failure
  • Unreliable patient
    – Parenterally 48 hours then switch to PO tx (see outpt meds)
      – Cefotetan OR Cefoxitin IV PLUS doxycycline IV or PO
    – Outpatient
      • Ceftriaxone IM single dose PLUS doxycycline PO x 14 days with or without metronidazole bid x 14 days

Contraception

• Natural Family Planning
• Barrier
  – Condom
  – Diaphragm
  – Cervical cap
  – Spermicide

• Hormonal
  – Oral contraceptives (combined and progestin only)
  – Patch
  – Vaginal ring
  – Injectable (Depo-Provera)
  – Implantable

• Intrauterine device (IUD)
• Sterilization
  – Male
  – Female
• Emergency contraception
Natural Family Planning

- Identify time of ovulation and avoid intercourse 48 hours before and after this time
- Ovulation predicted by:
  - Past menstrual cycles
  - Rise in basal body temperature
  - Cervical mucus from watery to sticky/stringy
- Failure rate: 25%

Barrier Methods

- Condom
  - Only contraception effective in protecting against STIs
- Diaphragm
  - Can be inserted 1-2 hours before intercourse/used with spermicide
  - Can cause bladder irritation
- Cervical cap
  - Small cup-like diaphragm fitted by gynecologist
  - Placed on cervix up to 2 days before intercourse
- Spermicides-Nonoxynol-9
  - Foams/vaginal suppositories/jellies that kill sperm
  - Inserted up to 30 minutes before intercourse
  - Irritation to genital membranes
Barrier Methods-ALL

- Advantages
  - Lack systemic side effects
  - Low cost

- Disadvantages
  - Loss of spontaneity

Hormonal Methods

Estrogen and Progestin Combination

- Oral Contraceptive Pills
  - Combination estrogen/progestin pills most common
  - 3 weeks on-1 week off for menses
  - Monophasic- fixed dose every day of cycle
  - Multiphasic- fixed estrogen but progesterone increases each week

Hormonal-Estrogen and Progestin

- Patch (OrthoEvra)
  - Patch changed once a week x 3 weeks, one week off
  - Failure rate 1% but increases if weight is more than 200 lbs.

- Vaginal Ring (NuvaRing)
  - Transvaginal vinyl ring placed in vaginal fornices x 3 weeks
  - Failure rate less than 1%
  - Nulliparous women
Hormonal Estrogen and Progestin Combination

- Mechanism of Action for ALL:
  - Estrogen suppresses FSH so no follicle/ovulation
  - Progesterone suppresses the LH surge so no ovulation
  - Thicker cervical mucus-hostile to sperm
  - Endometrial atrophy-unfavorable to implantation

Estrogen Containing Hormonal Methods-Benefits

- Decreases risk of:
  - Endometrial and ovarian cancer
  - Ovarian cysts
  - Endometriosis
  - Dysmenorrhea
  - Fibrocystic breasts

- Regulates menses

Estrogen Containing Contraception

- Absolute contraindications
  - Pregnancy
  - Hx of
    - Venous thrombosis or pulmonary embolism
    - CVA, CHD
    - Breast/Endometrial Cancer
    - Melanoma
    - Abnormal liver function tests or liver tumor

- Relative contraindications
  - Diabetes
  - Sickle cell disease
  - Chronic hypertension
  - Hyperlipidemia
  - Vascular headache
  - Depression
  - Smoker over 35 years
Hormonal Method
Progestin only

- Progestin-only pills ("mini-pills")
  - Taken everyday (no week off like combo pills)
  - High incidence of breakthrough bleeding
  - Failure rate is 3%

- Indications
  - Breast feeding
  - over 40 years
  - Women who can not take estrogen

Hormonal-Progestin Only

- Intramuscular injection (Depo-Provera)
  - Depot-medroxyprogesterone acetate
  - Every 3 months, Failure rate 0.3%
  - Return of ovulation can take up to 18 months
  - Common side effects
    - Break through bleeding
    - 5 lb/year weight gain
    - Mood changes
  - BLACK BOX WARNING
    - calcium loss, bone weakness, maybe osteoporosis
    - Use for 2 years or less

Hormonal-Progestin only

- Subcutaneous rod insertion under upper arm skin
  - Jadelle-2 levonorgestrel rods replaced every 5 years
  - Implanon-1 etonorgestrel rod replaced every 3 years

- Ovulation prompt after removal

- Side Effects
  - Scaring at insertion site
  - Break through bleeding
Hormonal
Progestin Only

- Mechanism of Action- of ALL of them:
  - Same as combination methods except:
    - Mature Follicle is formed but not released
    - Suppresses LH surge
    - No effect on FSH

- Progestin Only-contraindications
  - Breast carcinoma
  - Liver tumors

IUD

- Types
  - Levonorgestrel (Mirena)
    - Replace every 5 years
    - Decreases menstrual cramping and bleeding
  - Copper-banded (ParaGuard)
    - Replace every 10 years
    - May increase cramping and bleeding

- Mechanisms of action
  - Implantation altered- hostile endometrial environment
  - Ovum transport altered- changed tubal ciliary action

IUD

- Indications
  - Multiparous
  - Oral contraceptives contraindicated/intolerated
  - Smokers over 35 years
  - Monogamous relationship

- Contraindications
  - Absolute
    - Pregnancy
    - Undiagnosed uterine bleeding
    - Acute gyn infection
    - Suspected gyn malignancy
  - Relative
    - Multiparity
    - Previous ectopic pregnancy
    - Hx of multiple sex partners or STIs
    - Heavy menses
IUD

- Complications (most commonly occurs at time of insertion)
  - Uterine perforation
  - Salpingitis
  - Ectopic pregnancy
  - Menorrhagia and metrorrhagia

Sterilization

- Tubal sterilization-most common
  - Failure rate 0.5%

- Vasectomy
  - Failure rate 0.2%

Emergency Contraception

- Indications
  - Rape
  - Barrier contraceptive failure
  - Any other unprotected intercourse

- Plan B-levonorgestrel (progesterone)

- 1st dose within 72 hours up unprotected sex (some now say 120 hours) 2nd dose 12 hours later

- Efficacy greater than 95%
Infertility

- Inability to conceive within 12 months of unprotected sex
- Primary-absence of previous pregnancy
- Secondary-after previous pregnancy

Causes
- Anovulation - most common
- Tubal Disease
- Male factor
- Unexplained/multifactorial

Infertility-Anovulation

Etiology
- Polycystic Ovaries
- High prolactin levels
- Hypothalamic-pituitary dysfunction
- Hypothyroidism

Diagnosis
- Menstrual diary
- Luteal-phase (day 21) progesterone level less than 3ng/ml
- No mid-cycle basal body temperature increase

Management
- Bromocriptine to tx hyperprolactinemia
- Clomiphene citrate to hyperstimulate ovulation
- Metformin increases ovulation and pregnancy rates when PCOS is cause

Infertility-Tubal Disease

Etiology
- Think scarring/adhesions
- PID, endometriosis, hx of ruptured appendix, previous ectopic pregnancy

Diagnosis
- Hysterosalpingogram
- Laparoscopy

Management
- Surgery/lysis of adhesions
Infertility-Male factor

- Abnormal semen analysis-most common male factor

- Etiology
  - Increased scrotal temperature
  - Smoking
  - Excessive ETOH ingestion
  - Epididymitis
  - Varicocele
  - Endocrine disorders

- Diagnosis- Semen analysis

- Management
  - Treat if etiology is identified
  - Intrauterine insemination (IUI)
  - Intracytoplasmic sperm injection (ICSI)
  - Donor insemination

Infertility-General Approach

- Phase I (inexpensive/noninvasive)
  - Detailed history and type of coitus
  - Ovulation tracking
  - Semen analysis
  - TSH, prolactin, LH
  - FSH in women over 35 years

- Phase II (more expensive/more invasive)
  - hysterosalpingogram
  - Laparoscopy
  - IVF if no cause is found by this point

End of Part One
Please go on to Part Two
Fetus/ Infant Nomenclature

• Abortion: < 20 wks gestation or weight < 500 grams
• Premature Infant: 20-36 weeks gestation or 1000- 2500g
• Full Term Infant: After 37-42 wks gestation or > 2500g
• Postmature infant: > 42 wks gestation

Abbreviation of Obstetrical Hx

G - P T P A L
T - Total number of full term pregnancies (37-42 wks)
P - Total number of preterm pregnancies (20-36 wks)
A - Total number of abortions (elective or spontaneous) occurring before 20 wks
L - Total number of living children
** Twins count as ONE pregnancy, TWO live children
Manifestations of Pregnancy

- Presumptive Manifestations
- Probable Manifestations
- Positive Manifestations

Presumptive Manifestations

- Symptoms
  - Amenorrhea
  - Nausea/ vomiting
  - Quickening (fetal movement)
    - Nulliparas- 18-20 weeks
    - Multiparas- 14-16 weeks
  - Urinary frequency, nocturia, infection

- Signs
  - Chadwick’s sign
    - bluish discoloration of vagina and cervix
  - Increased basal body temperature
  - Skin changes:
    - Melasma/Chloasma (dark patches on face)
    - Linea nigra
Probable Manifestations

• Positive Pregnancy Test

• Hagar’s sign-softening between fundus and cervix

• Uterine Growth
  – 12 weeks- at symphysis pubis
  – 20 weeks-at umbilicus
  – After 20 weeks- 1cm for every week gestation

Positive Manifestations

• Fetal Heart Tones

• Ultrasound Examination of Fetus

Normal Lab Changes in Pregnancy

<table>
<thead>
<tr>
<th>System</th>
<th>Increase</th>
<th>Decrease</th>
<th>Unchanged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatic</td>
<td>Cholesterol</td>
<td>ALT, AST, LDH</td>
<td></td>
</tr>
<tr>
<td>Renal</td>
<td>BUN, Creatinine, Uric acid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hematologic</td>
<td>WBC, Fibrinogen</td>
<td>hemoglobin, hematoctrit</td>
<td>Platelet count</td>
</tr>
<tr>
<td></td>
<td>Clotting factors</td>
<td>PT, PTT</td>
<td></td>
</tr>
<tr>
<td>Thyroid</td>
<td>Total T3, T4</td>
<td>TSH</td>
<td>Free T3, T4</td>
</tr>
<tr>
<td>Pancreas</td>
<td>Plasma insulin</td>
<td>Fasting glucose</td>
<td></td>
</tr>
<tr>
<td>(until 24-28 wks)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
First Prenatal Visit-Labs

- **Blood:**
  - CBC
  - Blood type, Rh factor, antibodies to blood group antigens
  - Random glucose
  - VDRL (RPR)
  - Hepatitis B
  - Rubella
    - As indicated
      - Sickle cell trait
      - Cystic fibrosis
      - Tay-Sachs
- **Urine**
- **Pap smear (if less than 1 yr. since last)**
- **Group B Streptococcus**

Check on Every Visit

- **Maternal weight**
- **Blood pressure**
- **Fundal height**
- **Fetal size and presenting part**
- **Urine dipstick for protein, glucose, ketones**

Time Table for Screening Tests

- **First visit:** dating sonogram-discuss optional screening tests
- **10-13 weeks:** PAPP-A, nuchal translucency
- **15-18 weeks:** Alpha-fetoprotein (AFP) / quadruple screen
- **18-22 weeks:** Official anatomical sonogram
- **24-28 weeks:** Glucose challenge test (GCT)
- **28 weeks:** Rhogam if woman is Rh -
- **32 weeks:** Repeat CBC, VDRL, chlamydia, gonorrhea, Grp. B strep
Screening Blood Tests
Trisomy 21
• 1st trimester
  – Pregnancy-associated plasma protein A (PAPP-A)-low
  – Free beta-human chorionic gonadotropin (free b-hCG)-high

• 2nd trimester
  – Unconjugated estriol- low
  – Maternal alpha-fetoprotein-low
  – inhibinA- high

Optional Screening Test
• Nuchal translucency screening test
  • 10 weeks-13 weeks
  • Screen for Trisomy 21, 13, 18 and Turner’s Syndrome

Optional Diagnostic Tests
• 10-13 weeks: Chorionic villus sampling (CVS)
• 15-20 weeks: Amniocentesis
### Recommended Weight Gain During Pregnancy

- 20-35 lbs.  
  average weight women
- 40-45 lbs.  
  under weight women
- 10-15 lbs.  
  overweight women

### Nutrition During Pregnancy

- Pregnant intake= increase 300 kcal/ day
- Prenatal Vitamins
  - folic acid (0.4 mg/day)
  - Iron (30 mg/day)

### Things to Avoid

<table>
<thead>
<tr>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking, ETOH, drugs</td>
</tr>
<tr>
<td>Unpasteurized food (apple cider, soft cheeses)</td>
</tr>
<tr>
<td>Raw meat, seafood</td>
</tr>
<tr>
<td>Deli meat</td>
</tr>
<tr>
<td>King mackerel, shark, swordfish, tuna, tilefish</td>
</tr>
<tr>
<td>Farm salmon</td>
</tr>
</tbody>
</table>
Stages of Labor

- First Stage- Onset of labor to fully dilated (10 cm)
- Second Stage- fully dilated to birth of infant
- Third Stage- Delivery of infant to delivery of placenta

Signs of Placental Separation

- Fresh show of blood
- Cord lengthening
- Fundus rises
- Uterus firm and globular

Causes of Dystocia in Labor

- Pelvic Factors
  - Inadequate pelvis
  - Cephalopelvic disproportion (CPD)
  - Failure to descend
- Contraction Factors
  - Inadequate contractions and subsequent failure to dilate
  - Treatment-Pitocin
Aids in Delivery

- **Episiotomy**
  - Incision to widen the vulvar orifice, permitting easier passage of the fetus

- **Forceps**
  - Instruments used to “pull” the baby out

- **Vacuum**
  - Round suction placed on head to apply traction while mom pushes

Induction of Labor

- Induction of labor by medical or surgical means

- Considered when prolongation of pregnancy might expose mother or fetus to complications and vaginal delivery is not contraindicated

Indications for Induction (most common)

- Prolonged pregnancy
- Diabetes mellitus
- Pre eclampsia
- Suspected intrauterine growth retardation
Induction-Absolute Contraindications

- Cephalopelvic disproportion
- Placenta previa
- Uterine scar from previous classical C-section
- Transverse lie

Methods of Induction of Labor

- Pharmacologic
  - Early (minimal dilation or effacement)
    - Prostaglandin Gel (cervidil): given vaginally. Helps to "ripen" the cervix
  - Some dilation and effacement
    - Oxytocin (Pitocin): causes uterine contractions. Given intravenously

Induction of Labor (cont)

- "Surgical"
  - Amniotomy: Rupturing of membranes, usually with a hook
Fetal Monitoring
ANTEPARTUM TESTING
• Nonstress test (NST)
• Contraction Stress test (CST)
• Vibroacoustic stimulation
• Biophysical Profile

Antepartum Fetal Monitoring
• Non stress test (NST)
  • Reactive test
    • 2 accelerations in 20 minutes, up 15 beats from baseline for 15 seconds
    • Positive test is a GOOD thing
  • Some of the Indications:
    • preeclampsia
    • IUGR
    • gestational diabetes
    • decreased fetal movement

Antepartum Fetal Monitoring
• Contraction Stress Test (CST)
  • Also called an oxytocin challenge test
  • Done to observe HR response to contractions
  • Pitocin is given to cause contractions
  • late decelerations with each contraction constitutes a positive test
  • Positive test is a bad thing
Antepartum Monitoring

- Vibroacoustic Stimulation (VAS)
  - Auditory source (often artificial larynx) placed on maternal abdomen
  - Short burst of sound delivered to fetus to “wake up” fetus
  - Used when NST is non-reactive

Antepartum Testing

- Biophysical profile (five components):
  - Most often done after a non-reactive NST and heart rate stays non-reactive after VAS
  - Each component worth 2 points
    - NST reactivity
    - Fetal breathing
    - Gross Body movements
    - Fetal tone
    - Amniotic Fluid Index

Monitoring During Labor

- Heart rate and pattern is indicator of infant well-being
- Normal heart rate in newborn 120-160 bpm
- Consistent decelerations after a contraction can indicate fetal distress
Monitoring During labor

- **External Fetal Monitor**: On maternal abdomen. Most common
- **Internal Fetal Monitor**: Electrode attached to infant’s head

---

**Intrapartum Fetal Monitoring**

<table>
<thead>
<tr>
<th>FHR change</th>
<th>Appearance</th>
<th>Etiology</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accelerations</strong></td>
<td>Increase of baseline 15 bpm for 15 sec.</td>
<td>Response to fetal movement</td>
<td>Reassuring</td>
</tr>
<tr>
<td><strong>Early decelerations</strong></td>
<td>Mirror images of ears</td>
<td>Fetal head compression</td>
<td>benign</td>
</tr>
<tr>
<td><strong>Variable decelerations</strong></td>
<td>Rapid FHR drop with return to baseline with variable shape</td>
<td>Cord compression</td>
<td>Benign if mild or moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worrisome if severe</td>
</tr>
<tr>
<td><strong>Late decelerations</strong></td>
<td>FHR drop at end of contraction</td>
<td>Uteroplacental insufficiency</td>
<td>Always worrisome</td>
</tr>
</tbody>
</table>

---

**Non-reassuring FHR**

- Management
  - Stop Pitocin
  - Change maternal position
  - Oxygen
  - Fetal Scalp PH
    - Reassuring- greater than 7.20
    - Nonreassuring- less than 7.20
Induced Abortion

- Mifepristone and Misoprostol: a medical abortion procedure up to the first 7-9 wks LMP
- Suction Curettage: (safest and most effective for 12 wks or less) surgical procedure 3-16 wks LMP. Local anesthesia being used on the cervix.
- Surgical Curettage (D&C): Aspiration: a surgical abortion up to 16 wks LMP. It can also be referred
- Dilation and Evacuation (D&E): up to 18 wks outpt.
- Induction of Labor with Intra Amniotic Instillation after 16 weeks
- Induction of labor with vaginal prostaglandins after 16 weeks

Spontaneous Abortion

- any pregnancy which ends before 20 weeks gestation and/or a fetus that less than 500 grams
- More than 80 percent of abortions occur in first 12 weeks
- Risk increases with:
  - parity
  - increased maternal and paternal age
  - women who conceive within 3 months of a term birth

- About 60 percent of abortions are due to chromosomal abnormalities
- Next largest category of cause is "unknown"
- Factors include:
  - infection
  - anatomic
  - endocrine
- Environmental factors:
  - tobacco
  - ETOH
  - caffeine
Classification of Spontaneous Abortion

<table>
<thead>
<tr>
<th>Type</th>
<th>Vaginal Bleeding</th>
<th>Cervix Open</th>
<th>POC passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threatened</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Inevitable</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Incomplete</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
</tr>
<tr>
<td>Complete</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Missed</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

One more Spontaneous Abortion

- Habitual abortion- 2-3 or more consecutive spontaneous abortions
  - Genetic testing of parents
  - Thyroid (hypo and hyper)
  - Autoimmune (SLE and anticardiolipin antibodies)

Incompetent Cervix

- Cervical weakness causing passive, painless cervical dilation
- Results in first or second trimester abortion or preterm labor
- Management
  - Cerclage-cervical suture in 1st trimester to provide support to weak cervix
Normal B-hCG Levels

- Serum positive 8-9 days after ovulation
- Level doubles every 48 hours during first trimester of normal intrauterine pregnancy

ECTOPIC PREGNANCY

- Implantation of the blastocyst anywhere outside of the uterine cavity
- Most common location - tube (95%)

Etiology of Ectopic Pregnancy

Most common cause:
  - hx of salpingitis

Others
  - abnormalities of the tube (adhesions, tumors)
  - previous ectopic pregnancy
  - failed contraception (IUD)
Diagnosis of Ectopic Pregnancy

- Symptoms:
  - Pain (99%)
  - Vaginal bleeding (75%)
  - Amenorrhea (68%)

Signs of Ectopic Pregnancy

<table>
<thead>
<tr>
<th>Unruptured</th>
<th>Ruptured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical tenderness</td>
<td>Hypotension</td>
</tr>
<tr>
<td>Unilateral adnexal tenderness</td>
<td>Tachycardia</td>
</tr>
<tr>
<td>Adnexal mass</td>
<td>Abdominal guarding</td>
</tr>
</tbody>
</table>
Ectopic Pregnancy-Treatment

- **Surgical**
  - Used if patient does not meet criteria for medical treatment
  - Salpingostomy - if unruptured
  - Salpingectomy - if ruptured and tube destroyed

GESTATIONAL TROPHOBLASTIC DISEASE

- Neoplasms from an abnormal proliferation of the placenta or trophoblast

- Benign
  - Hydatidiform mole

- Malignant
  - Choriocarcinoma

[Image URL: commons.wikimedia.org/wiki/File:Blasenmole_Computertomographie_axial.jpg]
Hydatidiform Mole

<table>
<thead>
<tr>
<th>Complete (most common)</th>
<th>Incomplete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grape-like vesicles</td>
<td>No vesicles; fetus present</td>
</tr>
<tr>
<td>Empty egg</td>
<td>Normal egg</td>
</tr>
<tr>
<td>Paternal X's only</td>
<td>Maternal &amp; paternal X's</td>
</tr>
<tr>
<td>46, XX</td>
<td>69, XXY</td>
</tr>
<tr>
<td>Fetus absent</td>
<td>Fetus non-viable</td>
</tr>
<tr>
<td>20% progress to malignancy</td>
<td>10% progress to malign</td>
</tr>
</tbody>
</table>

**History/Physical**
- Vaginal bleeding (most common)
- Pre-eclampsia-like symptoms before 20 weeks
- Severe hyperemesis
- New onset hyperthyroidism
- Uterus larger than gestational age
- No fetal heart tones

**Studies**
- B-hCG titer (excessively high for pregnancy dating)
- Sonogram (sack of grapes or snowstorm pattern)

**Treatment**
D&C, serial bHCG, OCs x 1 yr

PRETERM LABOR

- Labor occurring after 20 weeks but before 37 weeks gestation
Preterm Labor-Triad

- Gestation less than 37 weeks
- Uterine contractions
  - greater/equal to 3 in 20 min
- Dilatation and effacement
  - greater/equal to 2cm on single exam or 1cm change on serial exams

Preterm Labor-Risk Factors

- Infection- bacteria from vaginal or cervical canal
  - Group B Step
- Premature rupture of membranes (PROM)
- Previous preterm birth
- Cocaine
- heavy cigarette smoking

Preterm Labor-Diagnosis

- Symptoms/ Signs:
  - contractions
  - dilatation and effacement
  - premature rupture of membranes (PROM)
  - vaginal bleeding/ pressure
Preterm Labor Diagnosis

- **Fetal fibronectin testing**
  - Cervical swab
  - Negative test result means low risk of delivery w/i 2 weeks

- **Cervical length**
  - 4 cm is normal
  - 2cm @ 24 weeks indicated increased risk of prematurity

- **Cervical length and fibronectin together**
  - Both abnormal: 50% chance of delivery before 34 wks
  - Both normal: only 11% chance of delivery

Preterm Labor-Management

- **Observation**
  - 30-60 minutes
  - Hydration

- **Antibiotics**
  - treat subclinical infection

- **Glucocorticoids (betamethasone)**
  - enhance fetal lung maturity
  - increase levels of surfactant

- **Tocolytics- decrease contractions/slow labor**
- **NO CLEAR 1ST LINE THERAPY**

Preterm Labor-Tocolysis Magnesium Sulfate

**Mechanism**
- inhibits myometrial contractility mediated by calcium
  - Therapeutic Level- 5.5-7.0 mg/dL
  - Side effects:
    - nausea, fatigue, generalized muscle weakness
    - Decreased reflexes
    - respiratory depression

**Pearl**
- Antidote- calcium gluconate
Preterm Labor-Tocolysis
Beta-mimetic adrenergic agents

• Ex. Ridodrine, terbutaline (black box warning)
  – **Mechanism**
    • stimulate beta-receptors to relax smooth muscle, therefore decrease contractions
  – **Side effects**
    • pulmonary edema
    • Maternal and/or fetal tachycardia
    • emesis, headaches

Preterm Labor-Tocolysis
Calcium Channel Blockers

• Nifedipine often used

• **Mechanism**
  – inhibit smooth muscle contractility by decreasing intracellular Ca2+ ions, therefore relax uterine muscle

• **Side effects**
  – Hypotension, tachycardia myocardial depression

PREMATURE RUPTURE OF MEMBRANES (PROM)

• Rupture of membranes before labor begins

• Most common diagnosis leading to NICU admission in United States
PROM-Risk Factors

- Exact cause unknown
  - vaginal/cervical infection (Grp. B strep, STI)
  - cervical incompetence
  - multiple pregnancy
  - cigarette smoking

PROM-Diagnosis

- **Symptoms:**
  - gush of fluid from vagina
  - persistent leakage of fluid from vagina
  - reduced size of uterus

- **Signs:**
  - Sterile Speculum Exam
    - pooling
    - nitrazine paper
    - ferning test
    - visual leakage of fluid from os

PROM-Treatment

- Risk of infection vs. prolonging gestation
- **After 35wks**: induction

- **34 wks**: controversial
  - some give betamethasone, wait 24 hours, then induce
  - may attempt to check for lung maturity by the lecithin/sphingomyelin (L/S) ratio
PROM-Treatment

- **Before 34 wks**
  - Goal is prolong pregnancy to 35 weeks, as long as mom and baby are stable
    - bedrest (trendelenberg position), pelvic rest
    - VS q 4 hrs
    - WBC daily
    - NST daily
    - biophysical profile, if NST non-reassuring
    - steroids
    - antibiotics

MATERNAL Rh ISOIMMUNIZATION

- Mom produces antibodies against foreign red blood cell antigens in maternal circulation
- **Most common** isoimmunization antigen is D
- Risk is present only if Mom is Rh - and Dad is Rh +, and baby is subsequently Rh +

MATERNAL Rh ISOIMMUNIZATION

- Most commonly occurs during birth, therefore does not affect current child
  - Problem in subsequent kids
- But if there is concern fetal blood has gotten into maternal blood at anytime, treatment is given
Rh Isoimmunization-Treatment

- **RhoGAM**
  - Mechanism
    - Binds to and hemolyzes any D-positive RBC in maternal circulation

- Most commonly given at 28 weeks

- Other high risk times
  - After delivery of Rh+ infant
  - Ectopic
  - Amnio
  - D&C
  - Trauma

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**MULTIPLE GESTATION**

- All the same symptoms of pregnancy, but usually more severe

- Prenatal office visits more often

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**Multiple Gestation-Complications**

- **Maternal- increased risk of:**
  - spontaneous abortion
  - premature labor and delivery
  - preeclampsia

- **Fetal- increased risk of:**
  - death
  - abnormal or breech presentation
  - prolapse of the cord
  - premature separation of the placenta before delivery
Gestational Diabetes

Incidence and Etiology

- Carbohydrate intolerance of variable severity which is present only during pregnancy

- Risk Factors of Developing GDM:
  - obesity
  - age over 25 years
  - Ethnicity (AA, Asian, Hispanic, Indian)

Maternal risk of:
  - Pre-eclampsia
  - Traumatic birth

Fetal Risk of:
  - macrosomia
  - prematurity
  - still birth
  - delayed fetal lung maturity

Screening/ Diagnosis

- 24-28 weeks: Glucose Challenge Test (GCT)
  - non fasting 50g glucose load
  - Check maternal glucose after 1 hour
  - if > 140 mg/dl (some say >130mg/dl), move to Glucose Tolerance Test (GTT)
GDM-Diagnosis

- **Glucose Tolerance Test (GTT):**
  - 100g oral glucose load
  - in morning after overnight fast
  - venous plasma glucose is measured at fasting, 1 hr, 2hr, and 3 hr
  - 2 or more abnormal values = gestational diabetes
  - (Some say only 1 abnormal value but this is NOT standard at this time)

**Plasma Glucose Levels (mg/dL)**

- Carpenter and Coustan
  - Fasting 95
  - 1hr 180
  - 2hr 155
  - 3hr 140

hA1C not generally used in diagnosing gestational diabetes

**White Classification of GDM**

- A1: diet controlled
- A2: Insulin required
GDM-Treatment

- Diet and exercise
- Fingersticks (4 times daily)
  - Fasting < 90 mg/dl
  - 2-hr post-meal < 120 mg/dl
- Insulin no glucose control in a week of dietary control
- (oral hypoglycemics-glyburide or metformin- have similar outcomes but are not standard of care)
- weekly check-ups and NSTs at 32-34 weeks
- Induction of labor
  - good control- at 40 wks
  - bad control or signs of macrosomia - at 38 wks

Prognosis of GDM

- If diagnosed during pregnancy, increased risk of DM in future
- If required insulin, 50% risk of diabetes within 5 years

Hypertension in Pregnancy

- Chronic Hypertension
  - HTN present prior to 20 weeks gestation
  - Good prognosis
    - Bp 140/90-179/109
    - No end-organ damage
  - Poor prognosis
    - Bp > 180/110
    - Renal disease
    - Retinopathy
### Chronic Hypertension

- Monthly sonogram to check for IUGR
  - If IUGR suspected
    - Weekly NSTs and/or BPP
- Serial BP and urine protein
- Patient should not go past due date
- Medication (only when bp is 150/100)
  - Methyldopa (most common)
  - Labetalol

### PREECLAMPSIA/ ECLAMPSIA

- Preeclampsia
  - Classic triad of hypertension, proteinuria, edema (but edema not really in criteria anymore)
- Eclampsia
  - the above plus seizures

- after 20 weeks gestation and most commonly near term
- Can occur postpartum, up to 2 weeks after delivery
- No increased risk of HTN later in life

### Preeclampsia

**Predisposing factors**

- Nulliparity *(most common)*
- extremes of age (under 20, over 35)
- multiple gestation
- diabetes
- chronic hypertension
Preeclampsia-Complications

- progression to eclampsia
- renal failure
- pulmonary edema
- HELLP syndrome
- DIC

- Prevention—1gm calcium daily during pregnancy

HELLP Syndrome

• Severe preeclampsia with:
  - Hemolysis
  - Elevated Liver enzymes
  - Low Platelets

Pre-eclampsia Classification

• Mild
  - Most common
    - Bp: 140/90 on 2 occasions at least 6 hrs. apart
    - Proteinuria: >300mg/24hrs but less than 5g/24hrs
    - absence of symptoms

• Severe
  - Bp: 160-180/110 on 2 occasions 6 hrs. apart
  - Proteinuria: >5g in 24hrs, or 3+ of more on 2 random urine dips, 4 hrs. apart
  - headaches, visual disturbances
  - RUQ pain, low urine output
  - elevated creatinine
  - elevated liver enzymes
Preeclampsia- Diagnosis

• Signs
  – hypertension
  – proteinuria
  – hyperreflexia

Preeclampsia-Diagnosis

• Labs:
  – sterile U/A
  – CBC
  – fibrinogen
  – PT/PTT
  – Chem panel
    • creatinine
    • uric acid
    • Liver function studies

Preeclampsia- Management

• “Cure”- Delivery of the fetus

• Mild preeclampsia
  – Before 37 weeks
    • If patient reliable- follow as outpatient
      – Bedrest, antepartum testing 2x/week, betamethasone if less than 34wks
    • If non-reliable- follow as inpatient
  – After 37 weeks
    • Delivery through induction
**Preeclampsia-Management**

- **Severe:**
  - Hospitalize

  - Under 34 weeks
    - Monitor within ICU setting
    - Betamethasone for fetal lung maturity

  - Over 34 weeks
    - Deliver vaginal vs. cesarean
    - Watch for HELLP

- Medication
  - MgSO4: seizure prophylaxis
  - Hydralazine or labetolol for BP management

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**Placental Abruption**

- Separation of the placenta from the site of uterine implantation before delivery of the fetus

- Most common cause of 3rd trimester bleeding

- Most common obstetric cause of DIC

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**Placental Abruption-Risk Factors:**

- Hypertension
- Cigarette smoking
- Cocaine abuse
- Trauma
- Advanced maternal age
- PROM
Placental Abruption-Classifications:

- **External form**: blood drains through the cervix
  - More common, less serious
- **Concealed form**: hemorrhage confined within uterine cavity
  - Less common, more serious

Placental Abruption-Diagnosis

- **Symptoms**:
  - Vaginal bleeding (80%)
  - Abdominal pain (66%)
  - Moderate to severe back pain (66%)
  - Tender hypertonic uterus (30%)
- **Signs**:
  - Fetal distress

Placental Abruption

- **Labs/Tests**
  - Sonogram
  - Hgb/Hct
  - PT/PTT
  - Fibrinogen
- **BUT**: Diagnosis is mainly a clinical one
Placental Abruption-Treatment

- Depends on:
  - size of abruption
  - amount of bleeding
  - fetal well being
  - gestational age

- Emergency vs. expectant therapy

- Vaginal vs. cesarean delivery

Placental Abruption- Complications

- Fetal demise

- Maternal Hemorrhage

- Maternal DIC and death

PLACENTA PREVIA

- Placenta is implanted over the os
- Can be partial or complete
- cause of 20% of 3rd trimester bleeding

- Risk Factors
  - advance maternal age
  - multiple gestation
  - previous placenta previa
  - scarred endometrium (previous C/S)
  - multiparity
Placenta Previa—Diagnosis

- Symptoms:
  - painless, bright red vaginal bleeding
  - maybe cramping or contractions

- Signs:
  - sonogram
  - NO VAGINAL EXAM

Placenta Previa—Treatment

- Depends on:
  - amount of bleeding
  - gestational age
  - degree of previa
  - whether or not labor has begun

- Delivery by cesarean section

Placenta Previa—Complications

- Maternal
  - hemorrhage, shock, and death
  - infection
  - embolism

- Fetal
  - prematurity
  - hypoxia
POST PARTUM HEMORRHAGE

<table>
<thead>
<tr>
<th>Condition</th>
<th>Uterine Atony</th>
<th>Genital laceration</th>
<th>Retained Placenta</th>
</tr>
</thead>
<tbody>
<tr>
<td>most common (50%)</td>
<td>Uncontrolled vaginal delivery</td>
<td>Noncontracted uterus</td>
<td></td>
</tr>
</tbody>
</table>

Risk Factors
- Excessively short or long labor
- Uncontrolled vaginal delivery
- Noncontracted uterus
- Infected uterus

Findings
- Soft uterus
- Visual laceration
- Missing cotyledon on placenta

Management
- Uterine massage
- Oxytocin
- Suture
- Manual exploration

Endometritis
- Increased risk with:
  - Cesarean section
  - Ruptured membranes over 24hrs

- S/S
  - Most commonly present on 2-3 post partum day
  - Post partum fever (over 38 or 100.4)
  - Uterine tenderness

- Labs
  - WBC over 20,000
  - UA
  - Bacteria (vary widely from hospital to hospital)
    - Anaerobic streptococci (most common)
    - Gram-negative coliforms
    - Aerobic streptococci

- Treatment
  - Clindamycin plus gentamicin (first line therapy)
  - Ampicillin added if no response in 24-48 hrs.
  - Metronidazole added if sepsis is present
  - Ceftriaxone is alternate therapy
Thank you and good luck!

References

- Stead, Latha et al. *First Aid for the Obstetrics and Gynecology Clerkship*, 2002
- Tierney et al. *Current Medical Diagnosis and Treatment*, 45th edition, 2012